Lat 41.63331 Lon -121.29517

United States Department of Agriculture | Forest Service | Shasta-Trinity National Forests

Reply To: 3420 Date: August 6, 1991

Subject: Biological Evaluation of Insect and Disease Conditions in Two Areas on the Doublehead RD, Modoc NF (FPM Rept. N91-11)

To: Forest Supervisor, Modoc National Forest

On June 25, 1991, Gregg DeNitto, Pathologist, Dave Schultz, Entomologist and I visited with Anne Mileck, David LeBlanc, Claudia Schurwanz and Diane Cahir from the Doublehead Ranger District. They had requested pest management input regarding two areas of concern on the district. These areas were located on Timber Mountain and Cougar Butte.

Timber Mountain (T. 44 N., R. 6 E., Sections 20, 21, 28, 29)

The first area we visited was on the north side of the mountain where ponderosa pine mortality has been occurring for many years. One of the concerns the District has is the increase in fire hazard due to the past and present mortality. The mortality is located on both NFS-managed and adjoining private lands. The stands are primarily second-growth ponderosa pine that are densely stocked and stagnating. Some nearby stands have been recently thinned. Bitterbrush is common where canopy openings exist. This area had previously been examined by FPM in 1985 and black stain root disease had been identified (see enclosed evaluation).

The dead and dying pines we examined had evidence of black stain root disease (BSRD), caused by Leptographium wageneri var. ponderosae. In addition to BSRD, other organisms observed in the ponderosa pine included mountain pine beetle, Dendroctonus ponderosae, red turpentine beetle, Dendroctonus valens, California flatheaded borer, Melanophila californica, black pineleaf scale, Nuculaspis californica and western dwarf mistletoe, Arceuthobium campylopodum.

In ponderosa pine, BSRD appears to spread overland by root feeding insects. These insects feed on and reproduce in the inner bark of declining and weakened roots of dying and recently dead trees and stumps. Once the fungus is established, it grows through the xylem of the root system and stump and spreads to surrounding trees through rootlet contact and by growing short distances through soil to infect small rootlets. The strain of the fungus that is present on Timber Mountain attacks only ponderosa and Jeffrey pines.

Several large areas in the eastside pine type have been identified as being infested by BSRD in the past few years. Previous recommendations have been directed at limiting further underground spread of the fungus in existing centers by removing infected trees on the margin of expanding centers and a

.fer of surrounding healthy trees. The openings are then regenerated with a mix of non-host species. In situations in eastside pine similar to Timber Mountain, we have observed where these openings can become quite large because of the number of centers and the area required to encompass the centers and buffers. These large openings may have negative effects on other resources. Also, on these dry sites, there are no alternative species for regeneration other than juniper or possibly incense-cedar.

New center initiation has been considered an infrequent event. Recent observations suggest that new centers may develop more readily than previously thought, especially after thinning activities in areas where BSRD is already present.

The following management alternatives are presented for consideration for this area.

1) No Action. Tree mortality will continue in and around disease centers. Rates will be higher during and for 1-2 years following the current drought. Nearby healthy trees may also be attacked by bark beetles that are attracted by the pheromones produced by the bark beetles that are attacking the root diseased trees. Some of the more severely dwarf mistletoe infected trees may also be attacked by bark beetles. Root disease centers will continue to enlarge and some will coalesce. These openings will gradually regenerate with pine, but in the short-term there will be patches of snags and down woody material occupied by rabbitbrush and grasses. Additional BSRD centers may develop, but it is unknown how many or where. New centers will add to the openings and accumulation of fuels on the mountain.

2) Salvage. The economic value of dead and dying trees will be recovered. Fuel loads will be reduced in the short-term, at least on NFS managed lands. Tree mortality will continue in and surrounding BSRD centers as these centers continue to enlarge. New centers may be initiated as a result of the disturbance caused by salvage operations. Additional tree mortality will occur beyond the root disease centers from bark beetle activity as stocking levels increase and tree vigor declines.

3) Thin Stands. Selected stands would be precommercially and commercially thinned to levels more appropriate for the site. This would permit the recovery of some dead and dying trees and improve the general stand vigor. Depending on the site index at particular locations, and on management objectives, basal areas from 80-120 square feet could be appropriate. Chainsaw or mechanical biomass harvesting would allow for retention of leave trees that have more vigorous appearing crowns, and would also provide some control over spacing. Prescribed burning can also be used to reduce or maintain a certain biomass level. Because prescribed burning may not be as precise as chainsaw or mechanical thinning, its use may be more appropriate in areas where timber values are low, or where wildlife and grazing values are equally high. In some BSRD centers, patch cuts may be appropriate, in addition to thinning, because of already low stocking levels. These could either be planted or allowed to seed in naturally. Future mortality levels would decrease from current levels, especially in areas without BSRD. Around BSRD centers, mortality may decrease because of reduced root contacts and interruption of belowground spread of the fungus. However, it is possible that there may be an

ease in the initiation of new centers in the stand because of the creation of insect vector habitat and disturbance.

Thinning selected stands will also reduce bark beetle caused mortality of the stressed trees, particularly those trees around black stain centers that are still healthy.

4) Regenerate Stands. Stands that are being significantly affected by BSRD would be regenerated. On Timber Mountain, silviculturally this would best be accomplished by clearcutting and planting. Shelterwood or seed tree cuts may also be effective if the overstory trees are removed after the regeneration is established. Leave trees that are not removed could serve as harbors for BSRD and transmit the fungus to the regeneration. Leave trees in these types of cuts should be free of dwarf mistletoe. Also, trees bordering clearcuts should not be infected by dwarf mistletoe. The only suitable commercial species for regeneration are ponderosa or Jeffrey pines. There may be some concern about planting a host species, but BSRD has been observed only infrequently infecting seedlings in clearcut openings. To minimize future hazard from BSRD in the new stands, they should be managed intensively to maintain growth and keep them from stagnating. Stocking levels should be maintained at appropriate levels, especially early in the life of the stand, to minimize stagnation and the need for entries when the trees are larger. Maintainance of the stands at appropriate stocking levels will also reduce future mortality caused by bark beetles.

Numerous additional stops were made to examine the black pineleaf scales. Most of the ponderosa pines on Timber Mountain have some degree of scale infestation. There is reddish discoloration, chlorosis and necrosis of the heavily infested needles. The infestation has been ongoing for at least the past four years with current population levels reaching about 6-10 scales per inch on the heavily infested trees.

There are three life stages of this scale: egg, nymph and adult. The only mobile stage is the nymph or crawler. Large populations reduce the number, length and retention period of the needles. Scale populations are usually regulated by parasites. An unknown factor, or factors, over the past few years have reduced the parasite population and allowed the scale population to increase to the current high levels. A contributing factor to reduced parasite population levels this year may have been the extremely cold winter weather. The scale population will eventually decline due to natural causes.

In addition to the stress induced by the ongoing drought, the scales are placing additional stress on the trees, thus reducing the trees' vigor and thriftiness. Although most of the trees are infested to some degree and are showing symptoms of attack, the stand on the north side of the mountain that was thinned in 1985 appears to be less impacted by the scales. This may be due in part to the increased soil moisture available to the residual trees and the increase in tree vigor resulting from the reduced stocking levels, as well as the inability of the scale crawlers to easily disperse to other trees when there are greater distances between the trees.

Thinning the overstocked stands to a level more appropriate for the site will increase soil moisture available to the residual trees and increase tree vigor

..riftiness. A more vigorous stand is likely to be less impacted by ..ssible future rises in scale populations.

Control of the scales by an insecticide application is feasible on ornamental trees or in small areas but is not usually undertaken over large areas in a forested environment. There is only one record of black pineleaf scale being aerially treated with insecticide in California. It is not clear whether this treatment was successful because the scale population was reduced by natural causes during the same year on adjacent untreated land.

Cougar Butte (T. 44 N., R. 4 E., Section 14)

The final stop of the day we examined some dead and dying incense-cedar on Cougar Butte. The cedar saplings are growing in a very rocky site where there is a large component of pumice rock. The trees are under considerable drought stress and are under attack by cedar bark beetles, Phloeosinus spp. These beetles are found commonly in weakened and dying incense-cedars and are not very good at killing vigorous, healthy trees. The only condition where cedar bark beetles are found attacking healthy trees is where the beetles have built-up in large amounts of green cedar slash. Cedar bark beetles breed only in the portions of trees with thin bark. The portions of the trees with thick bark are usually occupied by roundheaded borers which breed only in extremely weak or dying cedars. More trees are likely to die until normal precipitation patterns return.

If you have any questions regarding this report please contact the FPM staff at the Shasta-Trinity Supervisor's office.

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